

A survey of the autumn 2009 and spring 2010 bird migrations at Lhasa, Tibet Autonomous Region, China

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Between July 2009 and May 2010 an extensive ornithological survey was carried out at Lhasa, Tibet Autonomous Region, China, in the city wetland complex focused on the Lhalu Wetland National Nature Reserve and the adjacent Lhalu and Lhasa rivers wetland complex. Counts were made along a series of transects on a weekly basis, generally consisting of two full field days each week. During the survey 113 avian species were seen, with arrival and departure dates of most migratory species being determined: 21 species were summer visitors, 22 winter visitors, 22 passage migrants, 12 altitudinal migrants, 3 vagrants, 1 probable escapee and 32 residents. Autumn migration began in early September, continued until late December and was of particular interest for shorebird passage. Spring migration began in mid-February and was ongoing in May when the survey was concluded; it was of particular interest for passage waterfowl. A review of, and comparison with, historical records was made and a number of species that have undergone significant declines since the 1940s have been identified. Sightings of Baikal Teal *Sibirionetta formosa*, Little Egret *Egretta garzetta*, Lesser Grey Shrike *Lanius minor*, Rufous-vented Tit *Periparus rubidiventris* and Red-throated Pipit *Anthus cervinus* are believed to be the first in the Lhasa city area. The Lhalu Wetland National Nature Reserve and the adjacent Lhalu River and Lhasa River wetland complex appear to qualify for designation as a Ramsar Wetland of International Importance under Criterion 6 based on their Ruddy Shelduck *Tadorna ferruginea* population. The Lhasa wetlands also appear to qualify under Criterion 2 based on the winter population of the Vulnerable Black-necked Crane *Grus nigricollis* and passage Common Pochard *Aythya ferina*.

INTRODUCTION

The city of Lhasa (29.650°N 91.117°E), Tibet Autonomous Region, China, lies at about 3,650 m in the Lhasa River valley on the southern Tibetan plateau. In spite of the high altitude, the combination of intense solar radiation, a southerly latitude and relatively sheltered location have created a mild microclimate within the much harsher environments of the Chang Tang region to the north and the high plateau to the south, both of which lie above 4,500 m. Average monthly minimum and maximum temperatures at Lhasa over the period 1955–2007 were about –9 to +7°C in January and 10–22°C in July, the coldest and warmest months respectively (NMC 2014).

As a consequence of this mild climate, birds are abundant year-round in the Lhasa valley, an important crossroads for various bird migration routes between South Asia, the Tibetan plateau, Central Asia and Siberia. Birds found in the Lhasa valley include winter residents that breed to the north, summer visitors wintering at lower altitudes to the south and east, passage migrants, and altitudinal migrants found on the valley floor in winter and on the surrounding mountain slopes in summer. In addition there are resident wetland, grassland, bush and forest dwelling birds.

Although the birds of the Lhasa region have been quite extensively documented (see e.g. Waddell 1905, Walton 1906, Ludlow 1950, Vaurie 1972, Zheng *et al.* 1983, Robson 1986, Bishop *et al.* 2000, Bishop & Drolma 2007, Lang *et al.* 2007, Lagdor *et al.* 2009, Lu 2009, Lu *et al.* 2010, Yang *et al.* 2011), there is little data about the arrival and departure times of migrants. Published data on bird migration at Lhasa has mainly been limited to general comments on the months and seasons when species were seen (e.g. Ludlow 1950). Although Vaurie (1972) collated bird sightings data from the field notes of various explorers of the Tibetan plateau, these covered the entire plateau over many decades and do not provide a systematic evaluation of the timing of bird migration at any specific location. In fact, the only reliable dates I was able to find for the arrival of a given species at Lhasa were for the Grey-backed Shrike *Lanius tephronotus*—these lay between 15–25 April in five years between 1991 and 1998, and even then no departure dates were recorded (Tsering 2000).

The avifauna survey reported here took place over nearly 10 months between July 2009 and May 2010; in addition to the dates of sightings, counts of most species were also made. These provide a record of both arrival and departure dates of migratory birds at Lhasa, and of the period over which the greatest numbers of a species

passed through (see Appendix 1). During this survey, I recorded 113 species. Previously, between September 2005 and April 2008, I made opportunistic observations around Lhasa: during 2006 two species, Little Owl *Athene noctua* and Common Rosefinch *Carpodacus erythrinus*, the former regarded as resident and the latter as a summer visitor, were recorded in the area surveyed in 2009–10 but were not encountered during the survey itself. This brought the Lhasa species count to 115, of which 81 were considered to be primarily migrants.

METHODS

The survey was made over a 43-week period from 11 July 2009 to 3 May 2010, although no observations were made between 25 July and 24 August 2009. The survey 'week' was arbitrarily considered to begin on Friday and observations, usually lasting 6–10 hours, were normally carried out on two days—Saturday and Sunday—each week, although in seven survey-weeks only one day was possible whilst in four weeks three days were worked. A number of days were cut short due to other commitments or bad weather (including a severe sandstorm). Observations were made using 10× magnification binoculars while walking and cycling a series of 16 selected transects around Lhasa (Table 1). Identification was confirmed where necessary using MacKinnon & Phillipps (2000) as the primary reference and Grimmett *et al.* (1999) as a secondary reference.

The main focus of the survey was the Lhalu Wetland National Nature Reserve along with the nearby Lhalu and Lhasa river wetlands, although occasional observations were made in various parks, wooded areas, shrub and pasturelands around the city (Table 1). The main study transects along the Lhalu wetland and Lhalu and Lhasa rivers were surveyed, mainly on a weekly basis, permitting the timing of the arrival and departure of migratory birds to be documented to within about a week during the autumn and spring migration periods. The weekly counts provide a conservative estimate of the numbers of the various birds recorded on the transects, allowing a good estimate of the relative abundance of the species observed to be made.

RESULTS

Survey findings on the timing of migration through Lhasa on a weekly basis are summarised in Tables 2–6, while detailed species

Table 1. Summary of survey transects.

Note: Species' systematic names are listed in Appendix 1.

Code	Name	Length (km)	Visits	Habitat features	Notes
A	East Lhalu wetland	3.0	39	Open-water ponds, reed-beds, ponds with emergent vegetation, willow and sea buckthorn thickets, poplar groves, wet and dry meadows	Along the eastern fence of the Lhalu Wetland National Nature Reserve, about 1.5 km north of the Potala winter palace. Notable species: Black-necked Crane, White-tailed Eagle, Brown-cheeked Laughingthrush, Giant Babax, Northern Shoveler, Cattle Egret, Little Egret, Plain Mountain Finch, Red-throated Pipit
B	West Lhalu wetland	2.0	30	Reed-beds, open-water ponds, marsh, dry rocky mountain slopes	Along the southern fence of the Lhalu Wetland National Nature Reserve west of the reserve dividing road. Notable species: Ferruginous Duck, Common Pochard, Gadwall
C	Lhalu River Park	0.5	27	Small artificial lake, channelled river, separate pond with emergent vegetation, willow trees, weedy open areas	On the Lhalu River, about 9 km west of the Potala, located just north of West Jinzhu Road. Notable species: Common Moorhen, Tufted Duck, Baikal Teal
D	Lower Lhalu River	2.0	26	Channelled and unchannelled river, dry and wet meadows, willows planted in late 2008, floodplain, gravel and sand bars, xeric shrubs	Along the Lhalu River from West Jinzhu road to the confluence with Lhasa River. Notable species: Black-necked Crane, White-tailed Eagle, Ibisbill, Cinereous Vulture, Lesser Grey Shrike, Ruff, Kentish Plover, Common Greenshank
E	Lhasa River levee ponds	1.5	12	Open water, stream-fed ponds separated from the Lhasa River floodplain by a large levee	On the south bank of the river about 2 km west of the main Lhasa train station. Notable species: White-tailed Eagle, White-throated Dipper, Red-crested Pochard, Great Cormorant
F	Drepung forest	0.6	4	Poplar forest, shrublands, dry grasslands	Poplar forest along the pilgrim trail and auto road immediately below Drepung Monastery. Notable species: Rufous-breasted Accentor, Rufous-vented Tit, Russet Sparrow, Brown-cheeked Laughingthrush
G	Tchip valley	3.0	2	Rustic farming villages, dry pastures, barley terraces, poplar groves	South bank of Lhasa River, first valley west of the Lhasa–Chengdu highway bridge on the eastern outskirts of Lhasa. Notable species: Asian House Martin, Horned Lark, Tibetan Partridge
H	Dode village to Pabongka trail	5.0	2	Arid hill slope pastures, steep rocky slopes, shrublands	Pilgrim trail from Dode village in the valley east of Sera Monastery to Pabongka Monastery via Sera Utse hermitage. Notable species: Eurasian Crag Martin, Himalayan Griffon, Bearded Vulture
I	Lhukang Park	0.6	6	Trees, shrubs, lawns, artificial ponds	Park on the north side of the Potala. Notable species: Eurasian Blackbird, Bar-headed Goose, Pallas's Gull
J	Potala square	0.5	3	Trees, shrubs, lawns, artificial ponds	Square and park on the south side of the Potala. Notable species: Oriental Turtle Dove, Rock Dove, Great Tit
K	Norbulingka, south walls	0.7	5	Poplar groves, junipers, shrubs, lawns	Norbulingka summer palace south wall, 2.2 km west of Potala square. Notable species: Derbyan Parakeet
L	Drepung canyon	1.0	3	Rocky arid hill slopes, shrub-filled stream canyon, craggy cliffs	Stream canyon immediately north-west of Drepung Monastery. Notable species: Golden Eagle, Tibetan Snowcock, White-throated Redstart, White-winged Grosbeak, White-browed Tit Warbler
M	West bridge gravel pits	0.3	3	Wide braided river channel, floodplain gravel and sand bars, xeric shrubs	Gravel pits by the Lhasa River 1 km south-west of the west end of the levee ponds in transect E. Notable species: Black-necked Crane, White-tailed Eagle, Goosander
N	Dode valley	4.0	1	Rustic farming villages, barley terraces, pastures, shrub-lined stream channel, poplar and willow groves	Large farming valley immediately east of Sera Monastery. Notable species: White-throated Dipper, Northern Wren, Eurasian Crag Martin, Wallcreeper
O	Chagu valley	2.5	1	Rustic farming village, barley terraces, small stream channel, poplar trees, steep hill slope pastures	South bank of Lhasa River, immediately south of the west Lhasa auto bridge. Notable species: Horned Lark
P	Lhasa–Shigatse highway	About 20	1	Barley fields, floodplain shrublands, braided river channel, pastures, poplar groves, steep rocky hill slopes with arid grasslands	Lhasa–Shigatse highway along the right bank of the Lhasa River. Notable species: Bar-headed Goose, Ruddy Shelduck, Goosander, Tibetan Snowfinch, Pacific Swift, Eurasian Crag Martin

counts are summarised in Appendix 1. In terms of seasonal occurrence in the environs of Lhasa city, of the 115 bird species recorded, 22 were summer visitors (including Common Rosefinch, see above), 22 winter visitors, 22 passage migrants, 12 altitudinal migrants, 33 residents (including Little Owl, see above), 3 vagrants (all probably first records for the Lhasa area—see below) and 1 presumed escaped cage-bird—Crested Myna *Acridotheres cristatellus*, seen only on 11 July 2009 at the east Lhalu wetland.

Autumn migration began in early September and continued until late December: passage shorebirds were particularly interesting. Seven species were not seen on return spring passage: Common Snipe *Gallinago gallinago*, Wood Sandpiper *Tringa glareola*, Temminck's Stint *Calidris temminckii*, Ruff *C. pugnax*, Pacific Golden Plover *Pluvialis fulva*, Little Ringed Plover *Charadrius dubius* and Lesser Sand Plover *C. mongolus* (Table 4). Spring migration began in about mid-February and continued

at least into early May when the surveys were terminated. Spring migration was of particular interest for waterfowl, with five species not seen in autumn: Eurasian Wigeon *Mareca penelope*, Northern Shoveler *Spatula clypeata*, Northern Pintail *Anas acuta*, Tufted Duck *Aythya fuligula* and Baikal Teal *Sibirionetta formosa* (Tables 4 and 5). However, Eurasian Wigeon, Northern Pintail and Tufted Duck over-winter in large numbers at Yamdrok Yumtso Lake, just 75 km south-west of Lhasa (Lang *et al.* 2007). Peak counts of wintering ducks occurred from about mid-January to late February, with small numbers of a few species over-summering in Lhasa city, e.g. Ruddy Shelduck *Tadorna ferruginea*, Goosander *Mergus merganser* and Mallard *Anas platyrhynchos* (see Appendix 1). Conversely, a few predominantly summer visitors also over-wintered in Lhasa in small numbers, including Common Hoopoe *Upupa epops*, Oriental Turtle Dove *Streptopelia orientalis* and Grey-backed Shrike (Appendix 1), see also Lang *et al.* (2007). Altitudinal migrants began appearing

Table 2. Lhasa survey 2009–2010 departure and arrival dates of summer visitors.

Notes: occurrence status (Occ) used in Tables 2–6: A = abundant, regular in very large numbers; C = common, regular in large numbers; FC = fairly common, regular in moderate numbers; U = uncommon, regular in small numbers; R = rare, occasional in very small numbers.

* seen either in the Lhalu Wetland NNR or in the trees and bushes immediately adjacent to the reserve boundary.

Species	Departure date 2009	Arrival date 2010	Occ	Notes
Chinese Spot-billed Duck <i>Anas zonorhyncha</i>	24 October	24 April	FC*	Breeds on the Lhalu Wetland.
Common Hoopoe <i>Upupa epops</i>	~27 September	4 April	C*	Small numbers over-winter in Lhasa.
Eurasian Cuckoo <i>Cuculus conorux</i>	–	1 May	U*	Only seen 1 May 2010, one heard 2 May.
Pacific Swift <i>Apus pacificus</i>	–	10 April	FC*	Only 2009 sighting 18 July.
Oriental Turtle Dove <i>Streptopelia orientalis</i>	~3 October	17 April	C*	Small numbers over-winter in Lhasa.
Common Redshank <i>Tringa totonus</i>	28 November	10 April	C*	Small numbers appear to over-winter in Lhasa.
Common Tern <i>Sterna hirundo</i>	13 September	25 April	FC*	Seen in the Lhalu Wetland and along the Lhasa River.
Little Egret <i>Egretta garzetta</i>	17 October	17 April	U*	Only 2010 sighting 17 April.
Cattle Egret <i>Bubulcus ibis</i>	14 November	1 May	C*	1 May 2010 sighting included birds in breeding plumage.
Grey-backed Shrike <i>Lanius tephronatus</i>	19 September	17 April	C*	Juvenile stragglers 24 October 2009 and 6 February 2010.
Eurasian Blackbird <i>Turdus merula</i>	29 August	24 March	FC	Only 2009 sighting 29 August. Earliest sighting by JDF 28 February 2008 in Potala Square.
Black Redstart <i>Phoenicurus achrurus</i>	6 September	27 March	FC*	One straggler 29 November 2009.
Hodgson's Redstart <i>Phoenicurus hodgsoni</i>	25 October	3 April	U*	One straggler 26 December 2009.
Sand Martin <i>Riporio riporio</i>	3 October	10 April	A*	Highest count 400, perched on power lines, east Lhalu, on the evening of 18 July 2009.
Eurasian Crag Martin <i>Ptyanoprogne rupestris</i>	8 November	6 March	C*	Six individuals seen 6 December 2009.
Barn Swallow <i>Hirunda rustica</i>	19 September	–	U*	Spring return date undetermined; after 3 May 2010.
Asian House Martin <i>Delichan dasypus</i>	6 September	–	FC	Arrival/departure dates undetermined. Only seen in the hills above Lhasa. Latest autumn sighting by JDF 1 October 2005, Ganden Monastery east of Lhasa.
Tickell's Leaf Warbler <i>Phylloscopus affinis</i>	31 October	24 April	C*	A straggler seen 13 December 2009.
Greenish Warbler <i>Phylloscopus trochiloides</i>	–	–	R	Only sighting 6 September 2009. Also see Lu (2009).
Russet Sparrow <i>Passer rutilans</i>	4 October	18 April	U*	Seen in villages and monasteries.
Citrine Wagtail <i>Motacilla citreola</i>	25 October	17 April	C*	Two juvenile stragglers 6 December 2009–10 January 2010.
Common Rosefinch <i>Carpadacus erythrinus</i>	–	–	R*	Only sighting 27 August 2006, a pair in the poplars along the Lhalu wetland dividing road.

Table 3. Lhasa survey 2009–2010 arrival and departure dates of winter visitors.

Species	Arrival date 2009	Departure date 2010	Occ	Notes
Bar-headed Goose <i>Anser indicus</i>	24 October	3 April	A*	Small numbers may summer on the Lhasa River.
Ruddy Shelduck <i>Tadorna ferruginea</i>	17 October	~25 April	A*	Small numbers summer on the Lhasa River.
Gadwall <i>Moreco strepero</i>	1 November	–	A*	32 still present 1 May 2010.
Mallard <i>Anas platyrhynchos</i>	~ 11 October	–	A*	139 still present 1–3 May 2010. Small numbers summer in the Lhalu Wetland.
Indian Spot-billed Duck <i>Anas poecilorhyncha</i>	17 October	~ 24 April	FC*	Conspicuous white tertials.
Common Teal <i>Anas crecca</i>	1 November	17 April	C*	Large groups on the newly restored ponds in the east Lhalu.
Ferruginous Duck <i>Aythya nyroca</i>	1 November	–	U*	Two still present 1 May 2010.
Goosander <i>Mergus merganser</i>	17 October	–	A*	69 (19 males) still present 1 May 2010. Small numbers summer and breed on the Lhasa River.
Black-necked Crane <i>Grus nigricollis</i>	15 November	20 March	FC*	Seen on the Lhasa River and occasionally in March 2010 in the east Lhalu.
Pintail Snipe <i>Gollinogo stenuro</i>	18 October	7 February	U	Distinguished from Common Snipe by lack of white trailing edge to wings and from Solitary Snipe by darker head markings and gregarious nature.
Common Greenshank <i>Tringa nebularia</i>	18 October	–	U	Two still present 3 May 2010.
Green Sandpiper <i>Tringa achropus</i>	19 September	–	FC*	Two still present 1 May 2010.
Northern Lapwing <i>Vanellus vanellus</i>	17 October	20 March	FC*	A group of 18 seen during pre-migration staging in the east Lhalu 13 March 2010.
Pallas's Gull <i>Larus ichthyotus</i>	17 October	–	C*	25 still present 1–3 May 2010. Small numbers summer on the Lhasa River.
Brown-headed Gull <i>Larus brunnicapillus</i>	31 October	–	C*	105 still present 1–3 May 2010.
White-tailed Eagle <i>Haliaeetus albicilla</i>	28 November	20 February	FC*	Appear to be increasing in number at Lhasa.
Cinereous Vulture <i>Aegypius manachus</i>	28 November	31 January	U	Appear to be increasing in number at Lhasa.
Hen Harrier <i>Circus cyaneus</i>	14 November	6 March	U*	Most sightings were of a lone female.
Common Buzzard <i>Butea butea</i>	18 October	21 February	U*	Single bird seen regularly.
Long-legged Buzzard <i>Buteo rufinus</i>	24 October	–	R*	Only other sighting this survey 15 November 2009. Earlier sightings by JDF 24 February 2007 (east Lhalu), 9 February 2008 (east Lhasa River bridge), 23 February 2008 (Penpo valley mouth).
Upland Buzzard <i>Butea hemilasius</i>	11 October	–	U*	One still present 3 May 2010.
Great Cormorant <i>Phalacrocorax corbo</i>	1 November	6 March	FC*	Single stragglers occasionally seen up to 24 April 2010.

on the valley floor between late September and early November and typically departed in April and early May (Table 5). The greatest species diversity was between 1 and 3 May 2010, when 58 species were recorded (Appendix 1).

Although detailed notes on breeding were not kept, conspicuous breeding species at Lhasa included Goosander (eight young seen on the Lhasa river on 25 August 2007), Chinese Spot-billed Duck *Anas zonorhyncha* (seen with young on 11 July 2009 in the east Lhalu—see below), Common Moorhen *Gallinula chloropus* (seen with one young on 27 September 2009 on the Lhalu River park pond), Common Coot *Fulica atra*, (first young of the year seen on 25 April 2010 in the west Lhalu) and Grey-backed Shrike (fledged young common in August and September around the Lhalu).

Sightings of particular interest

Chinese Spot-billed Duck *Anas zonorhyncha* and Indian Spot-billed Duck *A. poecilorhyncha*

Both Spot-billed Duck species (Carboneras & Kirwan 2016, del Hoyo *et al.* 2016) were recorded on the Lhalu. A population of Chinese Spot-billed Duck, distinguished by their brown tertials, that bred on the Lhalu (see above) was last seen in 2009 on 24 October and not again until 24 April 2010. Birds with the prominent white tertials characteristic of Indian Spot-billed Duck *A. poecilorhyncha* were first seen on 17 October 2009 and over-wintered on the Lhalu, where one remained until 1 May 2010. The first record of Spot-billed Duck at Lhasa was by Ludlow (1950) in

winter 1943; he apparently only saw one pair of what is now known as the Chinese Spot-billed Duck, indicating a significant increase in this species at Lhasa since that time. Maximum counts during my survey were 50 Chinese Spot-billed Ducks on 3 October 2009 and 39 Indian Spot-billed Ducks on 31 October–1 November 2009.

Northern Shoveler *Spatula clypeata*

Although recorded by Ludlow (1950), there were no further records from the Lhasa area for the rest of the twentieth century (Lang *et al.* 2007). However, Yang *et al.* (2011) reported the species between 2006 and 2010, although without providing dates or locations. I first recorded a single male Northern Shoveler on 24 February 2008 in the middle Penpo valley, 27 km north of Lhasa. During the survey period, the peak count was seven at the east Lhalu Wetland on 27 March 2010.

Baikal Teal *Sibirionetta formosa*

On 20 March 2010, a single male was observed for about 20 minutes dabbling with the resident Common Coots on the shallow pond in the Lhalu River park in west Lhasa (transect C), until flushed by two stone-throwing boys. I have been unable to find any earlier published records in the survey area and it is presumably a first

record. There are two earlier unpublished records of the species from the broader Tibetan plateau region, at Qinghai Lake on 28 October 2006 and in the vicinity of Lijiang, Yunnan, on 3 April 2007 (Hornskov 2006, 2007).

Derbyan Parakeet *Psittacula derbiana* (NT)

This species, a resident in the forests of Nyingchi prefecture, Tibet, some 300 km east of Lhasa, is one of the most popular cage-birds in Lhasa city and a feral population, presumably of cage-bird origin, is present, although at risk of re-capture by traders (Lang *et al.* 2007). The largest numbers are in the poplars of the Norbulingka (transect K), although the species can occasionally be seen anywhere in the city with a significant grove of trees.

Black-necked Crane *Grus nigricollis* (VU)

My first record of this species in Lhasa was a pair flying south on 28 October 2005, high above the Tchip Valley (transect G), while the last was on 20 March 2010 in the east part of the Lhalu. Although the Black-necked Crane population as a whole may be increasing (Farrington & Zhang 2013, Archibald *et al.* 2016, BirdLife International 2016), changing agricultural practices in wintering areas can make former crane habitat unsuitable (Bishop

Table 4. Lhasa survey 2009–2010 arrival and departure of passage migrants.

Species	Autumn 2009	Spring 2010	Occ	Notes
Eurasian Wigeon <i>Mareca penelope</i>	–	20 March–25 April	R*	Earlier Lhasa sightings by JDF 30 January 2006 (Lhalu), 13 & 24 February 2007 (Lhasa River levee ponds).
Northern Shoveler <i>Spatula clypeata</i>	–	27 March–11 April	R*	One male seen by JDF 24 February 2008 in the Penpo Valley.
Northern Pintail <i>Anas acuta</i>	–	21 February–6 March	R*	A straggler seen 17 April 2010 in the west Lhalu. Earlier Lhasa sighting by JDF 23 December 2007 (Lhasa River levee ponds).
Red-crested Pochard <i>Nettion rufino</i>	21 November–5 December	25 April	U*	Four winter sightings of 1–2 females between 17 January–20 March 2010. A male seen 25 April 2010.
Common Pochard <i>Aythya ferina</i>	1 November–26 December	6–20 February	U*	Only two single males seen on return passage.
Tufted Duck <i>Aythya fuligula</i>	–	6 March – ?	R	One female still present 3 May 2010 (Lhalu river park 'lake').
Common Snipe <i>Gallinago gallinago</i>	11–31 October	–	U*	Not seen on spring passage. One seen 24 January 2010.
Wood Sandpiper <i>Tringa glareola</i>	3–24 October	–	R*	Not seen on spring passage.
Common Sandpiper <i>Actitis hypoleucos</i>	5–13 September	18 April – ?	R	One still present 3 May 2010.
Temminck's Stint <i>Calidris temminckii</i>	27 September–11 October	–	R*	Not seen on spring passage.
Ruff <i>Calidris pugnax</i>	28 November–20 December	–	R	Not seen on spring passage.
Pacific Golden Plover <i>Pluvialis fulva</i>	11 October	–	R*	Only sighting on 11 October 2009.
Little Ringed Plover <i>Chorodrius dubius</i>	18 October–15 November	–	U	Not sighted on spring passage. One individual sighted 20 December 2009.
Kentish Plover <i>Chorodrius alexandrinus</i>	–	18 April	R	Only sighting 18 April 2010.
Lesser Sand Plover <i>Charadrius mangalus</i>	30 August	–	R*	Not seen on spring passage. Earlier Lhasa sighting by JDF 25 August 2007, two birds (Lhasa River levee ponds).
Great Crested Grebe <i>Podiceps cristatus</i>	5 September–19 December	27 March–25 April	U*	Only two spring sightings.
Grey Heron <i>Ardea cinerea</i>	11 October	–	R*	Only sighting 11 October 2009.
Rufous-throated Thrush <i>Turdus ruficollis</i>	–	17 April	R*	Only sighting 17 April 2010.
Bluethroat <i>Luscinia svecico</i>	12 September	–	R*	Only sighting 12 September 2009.
Common Stonechat <i>Saxicola torquatus</i>	12 September–3 October	10 April	U*	One seen four times between 20 December 2009 and 20 February 2010 in the Lhalu River park.
Greater Short-toed Lark <i>Colundrello brochydoctylo</i>	25 October	–	R	One seen 11 July 2009 just east of the Lhasa River levee ponds.
Olive-backed Pipit <i>Anthus hadgsani</i>	13 September	–	R	Only seen 13 September 2009.

Table 5. 2009–2010 arrival and departure dates of altitudinal migrants on the Lhasa valley floor.

Species	Arrival date	Departure date	Occ	Notes
White-throated Dipper <i>Cinclus cinclus</i>	5 December 2009	9 January 2010	R	1–2 individuals seen in the Lhasa River at the outflow of the Lhasa River levee ponds. Three later seen 7 March 2010 in the river above Dode village.
White-throated Redstart <i>Phaenicurus schisticeps</i>	16 February 2010	17 April 2010	U*	Dates for sightings on valley floor only.
Güldenstädt's Redstart <i>Phaenicurus erythrogaster</i>	17 October 2009	11 April 2010	C*	Common in the willow and sea buckthorn thickets in the north-east corner of the Lhalu wetland.
Wallcreeper <i>Tichodromo muraria</i>	18 October 2009	3 April 2010	U*	Seen on concrete canal walls, buildings and rocks.
Rufous-vented Tit <i>Periparus rubidiventris</i>	22 November 2009	24 January 2010	R*	Only three sightings of single birds.
Tibetan Snowfinch <i>Mantifringilla henrici</i>	18 October 2009	24 April 2010	U	Only two sightings.
Robin Accentor <i>Prunello rubeculoides</i>	31 October 2009	–	FC*	One still present 1 May 2010.
Rufous-breasted Accentor <i>Prunella straphiata</i>	7 November 2009	17 April 2010	U*	High count, three birds 22 November 2009.
Brown Accentor <i>Prunello fulvescens</i>	27 September 2009	–	C*	One still present 1 May 2010.
Plain Mountain Finch <i>Leucasticta nemaricala</i>	16 January 2010	3 April 2010	FC*	Only seen in the willow thickets at the edge of pastures in the north-east corner of the Lhalu wetland.
Beautiful Rosefinch <i>Carpodacus pulcherrimus</i>	31 October 2009	–	C*	Three still present 1 May 2010.
Streaked Rosefinch <i>Carpodacus rubicilloides</i>	24 October 2009	–	FC*	One still present 1 May 2010.

Table 6. Lhasa resident species.

Species	Occ	Notes
Tibetan Snowcock <i>Tetraogallus tibetanus</i>	FC	Frequently seen in the hills around Lhasa city.
Tibetan Partridge <i>Perdix hodgsoniae</i>	FC	Regularly seen near agricultural terraces in the hills around Lhasa city.
Derbyan Parakeet <i>Psittocolo derbionis</i>	FC*	Escaped cage-birds appear to be establishing a resident population around the Norbulingka; occasionally seen in other wooded areas.
Eurasian Eagle Owl <i>Bubo bubo</i>	R	Only sighting in the survey area, one 23 January 2010 on the Lhasa River gravel bars. One repeatedly seen on Tibet University campus during most of February 2006.
Little Owl <i>Athene noctua</i>	R	Only one seen in the survey area, 6 August 2006 in the Tchip valley.
Rock Dove <i>Columbo livio</i>	FC	Resident around Potala Square. First reported by Lang <i>et al.</i> (2007), presumably feral.
Hill Pigeon <i>Columbo rupestris</i>	C*	Although resident at Lhasa, numbers on the valley floor increase sharply in winter.
Common Moorhen <i>Gollinulo chloropus</i>	U*	Largest group five, 20 March 2010 in the Lhalu River park pond.
Common Coot <i>Fulica otro</i>	A*	Abundant in the west Lhalu wetland.
Ibisbill <i>Ibidorhyncho struthersii</i>	U	Regular in small numbers on gravel bars at the confluence of the Lhalu and Lhasa rivers.
Black Kite <i>Milvus migrans</i>	FC*	Regular in winter on the power-line pylons in the east Lhalu.
Bearded Vulture <i>Gypsoetes borbotus</i>	U	Resident in the high mountains around Lhasa.
Himalayan Griffon <i>Gyps himalayensis</i>	C*	Regular in large numbers on the hills above the Pabongka Monastery sky burial site.
Golden Eagle <i>Aquilo chrysoetos</i>	U*	Resident in the high mountains around Lhasa.
Common Kestrel <i>Falco tinnunculus</i>	FC*	Regularly seen hunting over pasture areas of the Lhalu.
Common Magpie <i>Pico pica</i>	FC*	Regular in poplar groves and villages on the outskirts of Lhasa.
Ground Tit <i>Pseudopodoces humilis</i>	FC*	Regular in open areas around Lhasa.
Red-billed Chough <i>Pyrrhocorox pyrrhocorox</i>	C*	Common around Drepung and Sera Monasteries.
White-capped Water Redstart <i>Choiromornis leucocephalus</i>	U	Frequent on rivers and mountain streams beyond Lhasa city.
Northern Wren <i>Troglodytes troglodytes</i>	FC*	Frequent on the Lhasa river levees and on steep rocky stream banks.
Great Tit <i>Parus major</i>	C*	Regular in wooded areas in the north-east corner of the Lhalu.
White-browed Tit Warbler <i>Leptopoeile sophioe</i>	U*	Regular in small numbers in shrubby areas on the valley floor and in surrounding hills.
Plain Laughingthrush <i>Gorullux dovidi</i>	FC*	Escaped cage-birds appear to be establishing a resident population (Lang <i>et al.</i> 2007).
Brown-cheeked Laughingthrush <i>Trochopteron henrici</i>	C*	Particularly common in shrubs and forest around Drepung Monastery.
Giant Babax <i>Bobax woddelli</i>	U*	Locally common in shrublands around agricultural villages outside Lhasa.
Oriental Skylark <i>Aloudo gulgulo</i>	C*	Common in the east Lhalu; display flight first seen 3 April 2010.
Horned Lark <i>Eremophilo olpestris</i>	FC*	Common on hill pastures around Lhasa in summer; smaller numbers on the valley floor.
Eurasian Tree Sparrow <i>Passer montonus</i>	A*	Common around houses.
White Wagtail <i>Motocillo albo</i>	C*	Common on ponds, streams and canals.
Rosy Pipit <i>Anthus roseotus</i>	U*	Only six sightings, all on wet meadows in the north-east of the Lhalu.
Twite <i>Corduelis flovirstris</i>	A*	Regular in large groups throughout the area.
White-winged Grosbeak <i>Mycerobos cornipes</i>	U	Small numbers in juniper scrub on the hills around Lhasa. Common in juniper forest at Reting Monastery north of Lhasa (Lang <i>et al.</i> 2007).
Godlewski's Bunting <i>Emberizo godlewskii</i>	FC*	Regular on barren hill slopes around Lhasa.

et al. 2000, Bishop & Drolma 2007). In the vicinity of Lhasa, autumn ploughing of fields and the proliferation of greenhouse farming have eliminated large tracts of former crane habitat, whilst a willow planting campaign in 2008 in pastures near the confluence of the Lhalu and Lhasa rivers made previously open crane habitat unsuitable, as does late-winter gravel extraction from the bed of the Lhasa River at the same location. The latter could easily be remedied by re-scheduling seasonal gravel extraction operations to April, after the cranes leave. The single largest group of Black-necked Cranes seen in this area was about 75 on 31 January 2009, when all gravel extraction and processing work stopped for several weeks for the Chinese Lunar New Year holiday. This species probably formerly bred in the area, as both Walton (1906) and Ludlow (1950) reported Black-necked Crane chicks at Lhasa in summer.

Temminck's Stint *Calidris temminckii*

A maximum count of two over three consecutive survey-weeks between 27 September and 11 October 2009, on the sandy bed of a concrete canal pond in the north-east of the Lhalu wetland. Although recorded widely on the Tibetan plateau, the only mention of the genus I have found in Lhasa is simply 'Erolia sp. Stints pass through Lhasa in autumn' (Ludlow 1950, Vaurie 1972).

Pacific Golden Plover *Pluvialis fulva*

One recorded on the east Lhalu wetland on 11 October 2009 is the first known record from Lhasa since an observation 'in autumn' 1942 by Ludlow (1950). Walton (1906) noted that he shot the only representative of this species that he saw at Lhasa, on 13 September 1904.

White-tailed Eagle *Haliaeetus albicilla*

Regularly recorded at Lhasa from 28 November 2009 to 20

February 2010. On 17 January 2010 a group of eight, including three juveniles, was bickering over a large fish caught from the Lhasa River levee ponds (transect E). A pair was regularly seen on a meadow in the east Lhalu, whilst others often rested on the gravel bars at the confluence of the Lhasa and Lhalu rivers. Robson (1986) first recorded the species in the same general area on 4 March 1986. The highest count during this survey was 11 on 23 January 2010, whereas the highest count reported by Lang *et al.* (2007) was four on 22 December 1991.

Cinereous Vulture *Aegypius monachus* (NT)

Regularly seen either circling over or resting on the gravel bars near the confluence of the Lhalu and Lhasa rivers between 28 November 2009 and 31 January 2010, with a high count of six resting there on 17 January 2010. First recorded by Robson (1986) in the same general area, with two seen on 4 March 1986; Lang *et al.* (2007) never saw more than one bird at a time.

Little Egret *Egretta garzetta*

Eight on the east Lhalu wetland on 11 July 2009 may be a first record for Lhasa since no earlier records could be located. This group appeared to have summered on the Lhalu, with five last seen on 17 October 2009. The following spring only one Little Egret was seen, on 17 April 2010, although the species may simply be a late spring arrival at Lhasa. Farrington *et al.* (2013) reported the recent appearance of the Little Egret on the north Tibetan Plateau.

Lesser Grey Shrike *Lanius minor*

A single bird was perched on rock piles in a barren field near the mouth of the Lhalu River on 15 and 22 November 2009, some 2,000 km south-east of the species's usual Central Asian breeding grounds. A snowstorm in western China a month earlier (Xinhua

2009) may have played a role in the bird's appearance; it is believed to be a first record for the Lhasa region.

Bluethroat *Luscinia svecica*

On 12 September 2009 a bird was skulking at the water's edge under *Datura stramonium* plants on a pond dyke in the east Lhalu wetland. Recorded up to the end of the 1940s between Lhasa and the Chumbi valley, mostly in September and October, by Walton (1906), Ludlow (1950) and Hugh Richardson; I have been unable to find any further records of this species between the 1940s and 2009. Author's note: according to Ludlow (1950), Hugh Richardson lived in Lhasa from 1936 to 1940 and between 1946 and 1950.

Rufous-vented Tit *Periparus rubidiventris*

I saw single birds on three occasions, in the forest below Drepung Monastery (transect F) on 22 November 2009 and in the willow groves in the south-east Lhalu Wetland on 10 and 25 January 2010. I have found no other records from Lhasa and this may be a first record for the Lhasa city area.

Barn Swallow *Hirundo rustica*

The only previous record of this species for the Lhasa region is an unspecified sighting (Yang *et al.* 2011) between October 2006 and January 2010. During my survey, a maximum of six Barn Swallows were regularly seen over the eastern Lhalu wetland between 18 July and 19 September 2009. The lack of earlier records suggests that it is a relatively new summer visitor to Lhasa. The species was not seen in spring 2010 and presumably arrived after 3 May, the last day of observation. In 2011, at the Longbao Reserve, Qinghai, Barn Swallows were first recorded on 3 June (Farrington *et al.* 2013).

Plain Laughingthrush *Garrulax davidi*

Although endemic to the north-east Tibetan plateau and northern China, released/escaped cage-birds are seen in Lhasa (Lang *et al.* 2007) and a feral breeding population may be establishing itself in the city. The largest number seen was seven birds around willow thickets in the south-east Lhalu wetland on 20 March 2010.

Red-throated Pipit *Anthus cervinus*

On 25 April 2010 a bird in breeding plumage recorded on a short-cropped, swampy meadow in the north-east Lhalu wetland, with a flock of Oriental Skylarks *Alauda gulgula*, is believed to be a first record for the greater Lhasa region.

Plain Mountain Finch *Leucosticte nemoricola*

Although the species is fairly common on mountain slopes and open valleys of the Himalaya and the Tibetan plateau, the only previous record from Lhasa was on 11 July 2005 at Drepung Monastery (Thorne & Thorne 2007). During my survey, the species was first seen on 16 January 2010 in shrub thickets in the north-east Lhalu wetland, where it was fairly common, with a peak count of 35 on 16 February. The last sighting was on the eastern Lhalu valley floor on 3 April 2010.

DISCUSSION

Notably, one large caveat to the survey results was that the Lhasa River was not visited during March 2010, thus species found primarily on transects D and E are probably under-reported for that month. A subtlety of the migration pattern of Goosander through Lhasa not revealed by Appendix 1 is that the first females were seen on 13 September 2009 whereas mature males were not seen until 1 November, 49 days later. A number of resident high-altitude species relatively common elsewhere in the Lhasa region and beyond were conspicuously absent throughout; these included Rufous-necked

Snowfinch *Pyrgilauda ruficollis* and White-rumped Snowfinch *P. taczanowskii*, Tibetan Lark *Melanocorypha maxima* and Tibetan Eared Pheasant *Crossoptilon harmani*.

Despite weekly observations during my survey, I was unable to determine the arrival and/or departure dates as well as seasonality of occurrence for the following 18 species: Gadwall *Mareca strepera*, Mallard, Goosander, Eurasian Cuckoo *Cuculus canorus*, Pacific Swift *Apus pacificus*, Common Greenshank *Tringa nebularia*, Green Sandpiper *T. ochropus*, Pallas's Gull *Larus ichthyaetus*, Brown-headed Gull *L. brunnicephalus*, Little Egret, Hodgson's Redstart *Phoenicurus hodgsoni*, Rufous-vented Tit, Barn Swallow, Asian House Martin *Delichon dasypus*, Greenish Warbler *Phylloscopus trochiloides*, Rosy Pipit *Anthus roseatus*, Brown Accentor *Prunella fulvescens* and Beautiful Rosefinch *Carpodacus pulcherrimus*. The data available for these species is summarised in Tables 2–6.

A review of Walton (1906) and Ludlow (1950) revealed that, in addition to the significant sightings included in the results section above, the status of the following migratory and resident species has changed significantly since the first half of the 20th century.

Ferruginous Duck *Aythya nyroca* (NT)

Described by Walton (1906) as breeding at Lhasa and far outnumbering other duck species in August and September; Ludlow (1950) noted that it was common and breeding at Lhasa. However, the highest count in my survey was only 10 birds, on 20 November and 26 December 2009, both in the west Lhalu wetland. It was not seen in summer: the first sighting was on 1 November 2009, with two birds still present on 1 May 2010. This species was not reported by Lang *et al.* (2007) but was recorded by Yang *et al.* (2011). My earlier records were at the Lhasa River levee ponds—on 13 and 24 February 2007 (not counted: seven birds) and on 23 December 2007 (two birds).

Eurasian Wryneck *Jynx torquilla*

Observed by both Walton (1906) and Ludlow (1950) who regarded it as 'fairly common'. The last known record of this species is from Zheng *et al.* (1983), who made their last survey at Lhasa in 1976.

Common Coot *Fulica atra*

Walton (1906) noted that Common Coots abounded in the marshes at Lhasa, but were not seen elsewhere in southern Tibet. However, the species was not mentioned by Ludlow (1950) and not recorded again until Lang *et al.* (2007), who considered it uncommon. Although depicted as a winter visitor to southern Tibet (MacKinnon & Phillips 2000, del Hoyo & Collar 2014), the species is now resident at Lhasa and the most numerous species seen there year-round.

Solitary Snipe *Gallinago solitaria* and Pintail Snipe *G. stenura*

Solitary Snipe *Gallinago solitaria* was listed by Ludlow (1950) as common in autumn and winter, whilst he listed Pintail Snipe *G. stenura* as an autumn passage migrant. During my survey, Common Snipe on autumn passage were distinguished by the white trailing edges to their wings. Most snipes not identified as Common Snipe were gregarious and had buff-coloured face markings. They were seen at the same location on the banks of the Lhalu River near its mouth between 18 October 2009 and 7 February 2010, the largest group being eight on 8 November 2009. These were thought to be Pintail Snipes, apparently winter visitors, not passage migrants. I did not definitively identify a Solitary Snipe.

Osprey *Pandion haliaetus*

Only recorded at Lhasa by Ludlow (1950) who saw it 'occasionally'.

Pallas's Fish Eagle *Haliaeetus leucoryphus* (VU)

Recorded by Walton (1906) as 'often seen at Lhasa' and by Ludlow (1950) as 'not uncommon', but not recorded subsequently.

Great Cormorant *Phalacrocorax carbo*

Walton (1906) recorded this species in August and September; Ludlow (1950) noted that it was common in autumn, but not seen 'in the depth of winter'. During my survey this species was a winter visitor, seen in Lhasa only from 1 November 2009 until 18 April 2010, with a peak count of 34 along the Lhasa River on 31 January 2010.

Common Raven *Corvus corax*

Waddell (1905) found Common Ravens *Corvus corax* to be 'the commonest of all the birds' in south-central Tibet, Walton (1906) noted that they were 'common everywhere' in southern Tibet and Ludlow (1950) said that they came to Lhasa 'in their hundreds to roost on Chogpori', 0.5 km west of Potala Square. During my survey, I did see not a single raven in Lhasa, although the species was regularly seen in small numbers around rural communities on the Tibetan plateau. This change is probably due to increased urbanisation in the Lhasa valley and improved methods of garbage disposal.

Hodgson's Redstart *Phoenicurus hodgsoni*

This species, described by Ludlow (1950) as 'common in summer' at Lhasa, is now rather rare.

Blue-fronted Redstart *Phoenicurus frontalis*

According to Ludlow (1950), this species was only recorded at Lhasa by Hugh Richardson (see above); today it is still fairly common in the Himalaya and eastern Tibetan Plateau.

Red-rumped Swallow *Hirundo daurica*

Described as very common in summer at Lhasa by Walton (1906) and Ludlow (1950), this species has not been recorded at Lhasa since, although it is common elsewhere on the east Tibetan plateau, notably in the river valleys on either side of Jyekundo in Qinghai. The Barn Swallow, apparently a recent arrival in Lhasa (see results above), may be moving into the vacant niche.

Giant Babax *Babax waddelli* (NT)

Although recorded by Waddell (1905) and Walton (1906) elsewhere in southern Tibet, Ludlow (1950) first recorded this species in Lhasa city, noting that it was 'moderately common' and 'a favourite cage bird'. During my study, a single pair was seen several times in winter and spring in willow and sea buckthorn thickets on the east side of the Lhalu wetland. The apparent decline is presumably due to the recent rapid urbanisation of Lhasa and to trapping for the cage-bird trade. It remains locally common in suitable brushy habitat around rural communities outside Lhasa.

Several factors may have influenced changes in populations of migratory birds at Lhasa. Perhaps the most dramatic has been the rapid urbanisation that began in the late 1980s and which has led to the disappearance of large areas of parkland, agricultural land and wetlands as the city has grown. For example, Li (2005) estimated that the area of the Lhalu wetland declined from 12 km² in 1951 to 6.2 km² in 2000. A second more positive development has been a partial restoration of the eastern Lhalu wetland from 2008–2009, which converted about 125 ha of wet meadow heavily grazed by cows to diked open-water ponds of varying depth. At the height of the decline of the Lhalu in 2002, before it was declared a national nature reserve in 2005, Li (2005) stated that only 28 species of birds occurred there and only five were seen regularly (Li 2005, Li & Pan 2013). The present survey recorded 89 bird species on the Lhalu and in adjacent poplar groves and willow/sea buckthorn thickets (Tables 2–6), with duck numbers on the Lhalu having increased as a result of the wetland restoration.

A third major factor affecting bird migration patterns at Lhasa is certainly climate change. Harrer (1954) described ice-skating on

a tributary of the Lhasa River in the late 1940s; ice-skating was not possible at any time during my stay in Lhasa from 2005 to 2010, although a thin layer of ice does still partially cover the Lhalu in winter. Climate change impacts on the Tibetan plateau since the late 1970s have included rising temperatures and a decline in the area of shallow, permafrost-controlled wetlands favoured by migratory waterfowl (Wang *et al.* 2006, Farrington 2009). One possible consequence of warming plateau temperatures may be the arrival in Lhasa of Cattle Egret *Bubulcus ibis* and Little Egret, species more typical of the tropical lowlands of South and South-East Asia. Cattle Egrets were first recorded at Lhasa by Lagdor *et al.* (2009) during their 2002–2003 survey, although Vaurie (1972) reported a record from Gyantse before 1950. Warming temperatures, and presumably less ice on wetlands, may also explain why Ferruginous Duck and Great Cormorant now over-winter at Lhasa whereas formerly they did not appear to do so (e.g. Ludlow 1950, Lang *et al.* 2007). With the great interest in recent years in emerging climate change impacts on bird migration (Cotton 2003, Ahola *et al.* 2004, Crick 2004, Moller *et al.* 2008), it is hoped that this study will provide a good phenological snapshot for future comparison.

Finally, the Lhalu Wetland National Nature Reserve and the adjacent Lhalu River and Lhasa River wetland complex appear to qualify for designation as a Ramsar Wetland of International Importance under Criterion 6 based on their Ruddy Shelduck population, with a maximum count of 1,200 (Appendix 1), which greatly exceeds the present minimum required species 1% threshold of 710 (Ramsar 2009, Wetlands International 2013). The Lhasa wetlands also appear to qualify under Criterion 2, whereby a wetland is considered internationally important if it supports Vulnerable, Endangered or Critically Endangered species (Ramsar 2009), based on the wintering Vulnerable Black-necked Crane and passage Common Pochard populations.

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Appendix 1–1 Lhasa species counts July to December 2009.

Notes: for details of transects see Table 1; a transect letter in brackets, e.g. (A), indicates that this transect was only partially completed on a given day; 'x' indicates that a species was seen but not counted; peak survey species counts for the complete survey are shown in bold. Status in Lhasa: R = resident, W = winter visitor, S = summer visitor, P = passage migrant, A = altitudinal migrant, V = vagrant.

Status in Lhasa	Species	Date (2009)																					
		Transect (see Table 1)																					
		11 July	18, 19 July	25 July	24 August	29, 30 August	5, 6 September	12, 13 September	19, 20 September	27 September	3, 4 October	11 October	17, 18 October	24, 25 October	31 October, 1 November	7, 8 November	14, 15 November	21, 22 November	28, 29 November	5, 6 December	12, 13 December	19, 20 December	25, 26, 27 December
AB DE	A (G)	(A)	(A)	A (B) FG	A (B) CDH	AD	ABO	AB CD	AB CD	A	ABC DE	ABC DI	ABC DE	ABC DI	AB CD	ABC DF (J)	ABC DEK	ABC DE	ABC DEK	AB CD	ABC DL		
R	Tibetan Snowcock <i>Trogon tibetanus</i>																						10
R	Tibetan Partridge <i>Perdix hodgsoniae</i>					3																	18
W	Bar-headed Goose <i>Anser indicus</i>						1	1	1	3		1	17	27	18	147	31	135	14	86	81	113	
W	Ruddy Shelduck <i>Todorno ferrugineo</i>	14										7	88	245	388	509	476	875	743	941	731	873	
W	Gadwall <i>Moreco strepero</i>													30	30	110	80	191	167	154	75	6	
P	Eurasian Wigeon <i>Moreca penelope</i>																						
W	Mallard <i>Anos platyrhynchos</i>	2						2	x	x	x	30	40	258	45	175	167	188	76	248	123	62	
S	Chinese Spot-billed Duck <i>Anos zonorhyncho</i>	24	4		x	6	x	6	18	x	50	x	10	1									
W	Indian Spot-billed Duck <i>Anos poecilorhyncho</i>											6		39	10	25	25	2	2	9	1	25	
P	Northern Shoveler <i>Spotulo clypeoto</i>																						
P	Northern Pintail <i>Anos ocuto</i>																						
V	Baikal Teal <i>Sibirionetto formoso</i>																						
W	Common Teal <i>Anos creco</i>													1	7	56	11	103	125	136	17	16	
P	Red-crested Pochard <i>Netto rufino</i>																1	10	6				
P	Common Pochard <i>Aythya ferino</i>													3	1	2		3	2	2	2	2	
W	Ferruginous Duck <i>Aythya nyroco</i>													3	6	6	4	10	6	6	6	10	
P	Tufted Duck <i>Aythya fuligulo</i>																						
W	Goosander <i>Mergus merganser</i>						6		5	4		41	37	113	114	174	155	227	199	194	118	177	
S	Common Hoopoe <i>Upupa epaps</i>	10	10		x	12	x	15	12	x	2	x	x	3	2	2	4	1	5	4	1	13	2
S	Eurasian Cuckoo <i>Cuculus canarus</i>																						
R	Derbyan Parakeet <i>Psittocolo derbiano</i>																	15		7			
S	Pacific Swift <i>Apus pocificus</i>		3																				
R	Eurasian Eagle Owl <i>Bubo bubo</i>																						
R	Rock Dove <i>Calumba livia</i>															1							
R	Hill Pigeon <i>Columbo rupestris</i>		3			x	x	x	x	x	x	x	6	7	3	5	4	11	23		36	21	16
S	Oriental Turtle Dove <i>Streptapelia orientalis</i>	25	24		x	15	x	x	20	x	x	x	1	4	3	12		1	1				
W	Black-necked Crane <i>Grus nigricollis</i>															6				2	6		
R	Common Moorhen <i>Gollinulo chloropus</i>						1		1	2								1		2		3	
R	Common Coot <i>Fulico otro</i>	100	3				75	40	85	x	65	x	x	135	232	165	170	150	285	370	357	331	248
W	Pintail Snipe <i>Gollinogo stenuro</i>												1		2	8	4		1			1	1
P	Common Snipe <i>Gollinogo gallinogo</i>																						
S	Common Redshank <i>Tringo totonus</i>	12	10		x	8	x	3	5		1	6	2	1	9	8	6		5	1	2	2	4
W	Common Greenshank <i>Tringo nebulorio</i>												5		2	2	2				1		1
W	Green Sandpiper <i>Tringo achropus</i>								4	2	3	4	6	3	6	3	5		2		3	4	3
P	Wood Sandpiper <i>Tringo glorealo</i>										1	1	2	1									
P	Common Sandpiper <i>Actitis hypoleucos</i>						2	2															
P	Temminck's Stint <i>Colidris temminckii</i>										2	1	2										
P	Ruff <i>Colidris pugnox</i>																		4	2			1
R	Ibisbill <i>Ibidorhyncho struthersii</i>															3		2		3	4		
P	Pacific Golden Plover <i>Pluvialis fulvo</i>											1											
P	Little Ringed Plover <i>Chorodrius dubius</i>												1		1	7	6						1
P	Kentish Plover <i>Chorodrius olexondrinus</i>																						
P	Lesser Sand Plover <i>Chorodrius mangalus</i>					1																	
W	Northern Lapwing <i>Vonellus vonellus</i>											10	18	22	6	6	8	13	3	2	2	2	1
W	Pallas's Gull <i>Lorus ichthyotus</i>	3	3			3	x	x		6	9	5	31	33	27	62	54	17	32	28	22	15	20
W	Brown-headed Gull <i>Lorus brunnicapitalis</i>														10	19	20	44	70	50	46	48	63
S	Common Tern <i>Sterno hirundo</i>	1	2			1	1	1															
R	Black Kite <i>Milvus migrans</i>						1	1						5	3	2	2	5	2	5	2	2	2
W	White-tailed Eagle <i>Haliaeetus albicillo</i>																	7	2	4			1
R	Bearded Vulture <i>Gypaetus barbatus</i>																						
R	Himalayan Griffon <i>Gyps himalayensis</i>		11			62										1							5
W	Cinereous Vulture <i>Aegyptius manachus</i>																		1	6	1	2	
W	Hen Harrier <i>Circus cyoneus</i>																2			1	2		1
W	Common Buzzard <i>Buteo buteo</i>												1	1	1	1							
W	Long-legged Buzzard <i>Buteo rufinus</i>																1						
W	Upland Buzzard <i>Butea hemilosius</i>											1	1	1	2			1					2
R	Golden Eagle <i>Aquila chrysaetos</i>																	1				1	1
R	Common Kestrel <i>Falco tinnunculus</i>								2		1		1				1	1		1	2	1	1
P	Great Crested Grebe <i>Podiceps cristatus</i>					1			4	3	7	7	8	6	9	4	4		1		1	1	

Status in Lhasa	Species	Transect (see Table 1)	11 July		18, 19 July	25 July	24 August	29, 30 August	5, 6 September	12, 13 September	19, 20 September	27 September	3, 4 October	11 October	17, 18 October	24, 25 October	31 October, 1 November	7, 8 November	14, 15 November	21, 22 November	28, 29 November	5, 6 December	12, 13 December	19, 20 December	25, 26, 27 December
			A B	A	(A)	(A)	A(B)	A(B)	AD	ABO	AB	AB	A	ABC	ABC	ABC	ABC	AB	ABC	ABC	ABC	ABC	ABC	ABC	ABC
			DE	(G)				FG	CDH			CD	CD		DE	DI	DE	DI	CD	DF(J)	DEK	DE	DEK	CD	DL
W	Great Cormorant <i>Phalacrocorax carbo</i>																1		3	2	11	8	4	4	1
S	Little Egret <i>Egretta garzetta</i>		8			8						4	5	3	5										
S	Cattle Egret <i>Bubulcus ibis</i>		10					41	16	33	43	19	6	8	6	10	5	3	2						
P	Grey Heron <i>Ardea cinerea</i>													1											
S	Grey-backed Shrike <i>Lanius tephronotus</i>		20	20				15	x	6	6	2	2			2									
V	Lesser Grey Shrike <i>Lanius minor</i>																		1	1					
R	Common Magpie <i>Pico pica</i>																3	2		4		1	2	1	
R	Ground Tit <i>Pseudopodoces humilis</i>							3	1			2			2	4		5	1	6			1	1	
R	Red-billed Chough <i>Pyrrhoroax pyrrhoroax</i>							2	x							3				4		2			42
A	White-throated Dipper <i>Cinclus cinclus</i>																					1			
S	Eurasian Blackbird <i>Turdus merula</i>							3																	
P	Rufous-throated Thrush <i>Turdus ruficollis</i>																								
P	Bluethroat <i>Luscinia svecico</i>									1															
S	Black Redstart <i>Phaenicurus achrurus</i>							2	6												1				
S	Hodgson's Redstart <i>Phaenicurus hodgsoni</i>							1								1									1
A	White-throated Redstart <i>Phaenicurus schisticeps</i>																								2
A	Güldenstädt's Redstart <i>Phoenicurus erythragastrus</i>														2	4	16	6	20	15	14	16	25	31	35
R	White-capped Water Redstart <i>Chaimarranis leucecephalus</i>																								
P	Common Stonechat <i>Saxicola tarquatus</i>									6	3	3	4												1
V	Crested Myna <i>Acridatheres cristatellus</i>		1																						
A	Wallcreeper <i>Tichadrama muraria</i>														1									2	1
R	Northern Wren <i>Traglydytes traglydytes</i>																				2		1		1
A	Rufous-vented Tit <i>Periparus rubidiventris</i>																			1					
R	Great Tit <i>Parus major</i>			2				4	x			2	6	3		7	3	2	2	12		1	2		1
S	Sand Martin <i>Riparia riparia</i>		60	400		x		40	x	25			48												
S	Eurasian Crag Martin <i>Ptyonoprogne rupestris</i>		20	25				10	x					3		30	30	34				6			
S	Barn Swallow <i>Hirunda rustica</i>			6	6			6	x	x	3														
S	Asian House Martin <i>Delichan dasyptus</i>							8	12																
R	White-browed Tit Warbler <i>Leptapoeocile saphiae</i>																4			1					1
S	Tickell's Leaf Warbler <i>Phyllascapus affinis</i>							20	15		7	2	6	3	x	7	5			1			1		
S	Greenish Warbler <i>Phyllascapus trachiloides</i>								1																
R	Plain Laughingthrush <i>Garrulax davidi</i>																								
R	Brown-cheeked Laughingthrush <i>Tracholopteran henrici</i>		2					12	x		2	1				3	6	4	4	12		1	2		35
R	Giant Babax <i>Babax waddelli</i>																								
P	Greater Short-toed Lark <i>Calandrella brachydactyla</i>		1													3									
R	Oriental Skylark <i>Alouda gulgula</i>			x				10		x	15	x	5		x	10	40	45	25	29	25	20	30	60	22
R	Horned Lark <i>Eremophila alpestris</i>							30	x		x					6	5		18						
S	Russet Sparrow <i>Passer rutilans</i>							6					6												
R	Eurasian Tree Sparrow <i>Passer mantanus</i>		40	40				20	x	x	20	x			x		35	10	25	91	60	50	30	106	95
A	Tibetan Snowfinch <i>Mantifringilla henrici</i>																								
R	White Wagtail <i>Motacilla alba</i>		26					15	x	x	60	x	10	x	65	6	49	16	33	33	28	16	81	31	45
S	Citrine Wagtail <i>Motacilla citreola</i>			2				3	x	6	43	x	25	x	45	2						1		1	2
P	Olive-backed Pipit <i>Anthus hadgsoni</i>										1														
V	Red-throated Pipit <i>Anthus cervinus</i>																								
R	Rosy Pipit <i>Anthus raseotus</i>																1								
A	Robin Accentor <i>Prunello rubeculoides</i>																5	6	1	4		1	2	1	12
A	Rufous-breasted Accentor <i>Prunella strophata</i>																	1		3					
A	Brown Accentor <i>Prunella fulvescens</i>								x			x	3			12	21	22	41	53	5	31	28	35	53
R	Twite <i>Carduelis floriastris</i>		2	8				25		x	35	x	35	x	x	33	23	15	18	13	31	44	60	85	190
A	Plain Mountain Finch <i>Leucosticte namaricala</i>																								
A	Beautiful Rosefinch <i>Carpodacus pulcherrimus</i>																6	6	8	20	10	12	9	6	22
A	Streaked Rosefinch <i>Carpodacus rubicillides</i>															4							1	4	8
R	White-winged Grosbeak <i>Mycerbas carripes</i>																								
R	Godlewski's Bunting <i>Emberiza godlewskii</i>		2	10				3	x				1				6	2		12				1	3
	No. of species seen		21	20	1	6	31	32	24	24	27	29	24	35	37	46	44	42	38	38	40	44	43	47	

Appendix 1–2 Lhasa species counts January to May 2010.

Notes: for details of transects see Table 1; a transect letter in brackets, e.g. (A), indicates that this transect was only partially completed on a given day; 'x' indicates that a species was seen but not counted; peak survey species counts for the complete survey are shown in bold.

Species	Transect (see Table 1)	Date (2010)																															
		1, 2, 3 January		9, 10 January	16, 17 January		23, 24 January		31 January	6, 7 February		13, 16 February		19, 20, 21 February		28 February	6, 7 March		13 March	20, 24 March		27, 30 March		3, 4 April		10, 11 April		17, 18 April		24, 25 April		1, 2, 3 May	
		ABE JK LM	AB CDE	AEF	ABC DEK	(A) (B) C (D) EKM	ABC DJ	A	ABC DEH	A	ABC N	A	ACI	A (B) CI	ABC DFI	AB CD	AB CDI	ABC DP	ABC DL														
Tibetan Snowcock <i>Tetraagallus tibetanus</i>		23																		9													
Tibetan Partridge <i>Perdix hadgsaniae</i>		20																		4	8												
Bar-headed Goose <i>Anser indicus</i>		54	70	160	317	135	168	80	227	46	263	89	73	45	28	5	7	5	1														
Ruddy Shelduck <i>Tadarna ferruginea</i>		210	1,015	177	1,099	963	1,200	185	1,065	227	314	290	272	180	453	193	36	41	17														
Gadwall <i>Mareca strepera</i>		14	37	220	277	296	307		85		54		8	10	34	16	24	16	32														
Eurasian Wigeon <i>Mareca penelope</i>													1	5	9	2		3															
Mallard <i>Anas platyrhynchos</i>		166	230	127	296	159	122	155	464	80	180	150	114	257	192	235	263	197	139														
Chinese Spot-billed Duck <i>Anas zanarhyncha</i>																			3														
Indian Spot-billed Duck <i>Anas paecilarhyncha</i>		15	11		7		2		22		12	6	2	9	5	2	6	2	1														
Northern Shoveler <i>Spatula clypeata</i>														7	2	1																	
Northern Pintail <i>Anas acuta</i>									8	8	5						1																
Baikal Teal <i>Sibirianetta farmasa</i>													1																				
Common Teal <i>Anas crecca</i>		63	35	41	37	10	13	100	67	85	116		4	80	1	17	15																
Red-crested Pochard <i>Netta rufina</i>					2		1			1			1					1															
Common Pochard <i>Aythya ferina</i>							1		1																								
Ferruginous Duck <i>Aythya nyroca</i>		8	2		6		6		6		3			5		1		2															
Tufted Duck <i>Aythya fuligula</i>											1					1	1	1															
Goosander <i>Mergus merganser</i>		204	290	214	239	171	163	56	201	35	176	54	104	87	70	33	56	129	69														
Common Hoopoe <i>Upupa epops</i>				1			3		2				1	1	7	11	13	19	18														
Eurasian Cuckoo <i>Cuculus canarus</i>																			2														
Derbyan Parakeet <i>Psittacula derbiana</i>		1			23								7																				
Pacific Swift <i>Apus pacificus</i>																1		34	8														
Eurasian Eagle Owl <i>Bubo bubo</i>					1																												
Rock Dove <i>Calumba livia</i>								x						12		x																	
Hill Pigeon <i>Calumba rupestris</i>		80	44	34	59	11	76	25	57	3	27	20	49	22	53	33	29	35	10														
Oriental Turtle Dove <i>Streptopelia orientalis</i>		4	1	3	5	2	13		3	5	9	3	3	6	4	10	23	24	26														
Black-necked Crane <i>Grus nigricallis</i>		2				75					6	3	2																				
Common Moorhen <i>Gallinula chloropus</i>		1	1		1	1			2		1		5	4	4	2	3	2	3														
Common Coot <i>Fulica atra</i>		317	387	24	380	276	372	45	282	34	229	70	120	234	223	229	243	192	167														
Pintail Snipe <i>Gallinago stenura</i>		5	2		3		2																										
Common Snipe <i>Gallinago gallinago</i>					1																												
Common Redshank <i>Tringa tatanus</i>			3		1		1		1							14	38	30	37														
Common Greenshank <i>Tringa nebularia</i>			2	2	2				2								2		2														
Green Sandpiper <i>Tringa achrapus</i>		2	2	1	3	2	1		6	1	3		1		6	3	7	6	2														
Wood Sandpiper <i>Tringa glareala</i>																																	
Common Sandpiper <i>Actitis hypoleucos</i>																		2	1														
Temminck's Stint <i>Calidris temminckii</i>																																	
Ruff <i>Calidris pugnax</i>																																	
Ibisbill <i>Ibidarhyncha struthersii</i>				1			3		3									1	2														
Pacific Golden Plover <i>Pluvialis fulva</i>																																	
Little Ringed Plover <i>Charadrius dubius</i>																																	
Kentish Plover <i>Charadrius alexandrinus</i>																	3																
Lesser Sand Plover <i>Charadrius mangalus</i>																																	
Northern Lapwing <i>Vanellus vanellus</i>			5	3	6	2	1	1	8	3	26	21	2																				
Pallas's Gull <i>Larus ichthyaetus</i>		19	29	20	57	25	40	9	28	2	55	90	81	90	45	94	115	36	25														
Brown-headed Gull <i>Larus brunnicephalus</i>		1	37		40	5	64	31	55		55		6	32	54	120	214	142	105														
Common Tern <i>Sterna hirunda</i>																		1	7														
Black Kite <i>Milvus migrans</i>		2	2	1	1		3	1	2		2	1	1	1				1															
White-tailed Eagle <i>Haliaeetus albicilla</i>		2	3	9	11	6	2		7																								
Bearded Vulture <i>Gypaetus barbatus</i>																			1														
Himalayan Griffon <i>Gyps himalayensis</i>		6		4					35		1				2			3	8														
Cinereous Vulture <i>Aegypius manachus</i>			4	6	2	2																											
Hen Harrier <i>Circus cyaneus</i>		2	2						1		2																						
Common Buzzard <i>Buteo butea</i>			1		1	1	1		1																								
Long-legged Buzzard <i>Buteo rufinus</i>							1																										
Upland Buzzard <i>Buteo hemilasius</i>		1					1			2	1	2	1		3	2	2	2	1														
Golden Eagle <i>Aquila chrysaetos</i>																																	
Common Kestrel <i>Falca tinnunculus</i>		2	2		1	1	1		1			1	1			1	1	3	3														
Great Crested Grebe <i>Padiceps cristatus</i>														1					1														

Species	Transect (see Table 1)	Date (2010)																					
		1, 2, 3 January		9, 10 January	16, 17 January		23, 24 January		31 January	6, 7 February	13, 16 February	19, 20, 21 February		28 February	6, 7 March	13 March	20, 24 March	27, 30 March	3, 4 April	10, 11 April	17, 18 April	24, 25 April	1, 2, 3 May
		ABE JK LM	AB CDE	AEF	ABC DEK	(A) C (D) EKM	(B) ABC DJ	A	ABC DEH	A	ABC N	A	ACI	CI	A(B) ABC DFI	AB CD	AB CDI	ABC DP	ABC DL				
Great Cormorant <i>Phalacrocorax carbo</i>		23	28	29	22	34	5		20	3		1							1	1			
Little Egret <i>Egretta garzetta</i>																				1			
Cattle Egret <i>Bubulcus ibis</i>																						9	
Grey Heron <i>Ardea cinerea</i>																							
Grey-backed Shrike <i>Lanius tephronatus</i>								1												1	1	7	
Lesser Grey Shrike <i>Lanius minar</i>																							
Common Magpie <i>Pica pica</i>								2					1							1			
Ground Tit <i>Pseudopodiceps humilis</i>		3					1						11				4	3	1			1	
Red-billed Chough <i>Pyrrhacorax pyrrhacorax</i>		8	2					2	2	30			5				7	8	1	1		12	
White-throated Dipper <i>Cinclus cinclus</i>		2	1										3										
Eurasian Blackbird <i>Turdus merula</i>															10	12	x			3		10	
Rufous-throated Thrush <i>Turdus ruficollis</i>																				1			
Bluethroat <i>Luscinia svecica</i>																							
Black Redstart <i>Phoenicurus phoenicurus</i>																	1	5	13	8	5	8	
Hodgson's Redstart <i>Phoenicurus hodgsoni</i>																		1	1				
White-throated Redstart <i>Phoenicurus schisticeps</i>		3							1	2		2	1				2		1			7	
Güldenstädt's Redstart <i>Phoenicurus erythrogaster</i>		44	50	26	32	2	46	35	38	35	41	23	15	6	2	4							
White-capped Water Redstart <i>Chaimarrornis leucacephalus</i>																						1	
Common Stonechat <i>Saxicola tarquatus</i>			1				1		1									3					
Crested Myna <i>Acridotheres cristatellus</i>																							
Wallcreeper <i>Tichodroma muraria</i>			1						1		2						1						
Northern Wren <i>Traglydytes traglydytes</i>												8					1						
Rufous-vented Tit <i>Periparus rubidiventris</i>			1		1																		
Great Tit <i>Parus major</i>			3	3	2	2	2		4		9		2	2	8	4	2					1	
Sand Martin <i>Riparia riparia</i>																	1	1	10	12			
Eurasian Crag Martin <i>Ptyanopraea rupestris</i>												5	3	3	2	12	25	10	111			2	
Barn Swallow <i>Hirundo rustica</i>																							
Asian House Martin <i>Delichon dasypus</i>																							
White-browed Tit Warbler <i>Leptopaeice saphiae</i>		4	2		1		1		2	2			3						2			2	
Tickell's Leaf Warbler <i>Phyllascopus affinis</i>																				2		15	
Greenish Warbler <i>Phyllascopus trachiloides</i>																							
Plain Laughingthrush <i>Garrulax davidi</i>									2	2		2	7	3	3				2	1			
Brown-cheeked Laughingthrush <i>Trachalapteran henrici</i>		13	1	10	1		3	1	12	9	12	7	4	4	18	5	1	2				14	
Giant Babax <i>Babax waddelli</i>									2	2			2									1	
Greater Short-toed Lark <i>Calandrella brachydactyla</i>																							
Oriental Skylark <i>Alauda gulgula</i>		5	14	3	38		70	3	29	8	22	13	17	6	32	30	57	61				40	
Horned Lark <i>Eremophila alpestris</i>								1		1												1	
Russet Sparrow <i>Passer rutilans</i>																				2		1	
Eurasian Tree Sparrow <i>Passer montanus</i>		80	65	112	65	50	45	11	85	100	30	25	15	25	68	12	48	34				36	
Tibetan Snowfinch <i>Mantifringilla henrici</i>																						80	
White Wagtail <i>Motacilla alba</i>		23	31	14	40	11	27	6	25	12	28	22	23	22	30	17	23	19				16	
Citrine Wagtail <i>Motacilla citreola</i>			2																7	6		3	
Olive-backed Pipit <i>Anthus hodgsoni</i>																							
Red-throated Pipit <i>Anthus cervinus</i>																						1	
Rosy Pipit <i>Anthus roseatus</i>				1								1	1							2		1	
Robin Accentor <i>Prunella rubeculoides</i>		7	1	6	3			10	5	2	16	1	5	5	8	3	3					4	
Rufous-breasted Accentor <i>Prunella straphiata</i>				2				2	1		1		2	2	2		1						
Brown Accentor <i>Prunella fulvescens</i>		31	48	35	31	12	25	14	49	18	34	7	28	15	33	47	24	13				13	
Twite <i>Carduelis flavirostris</i>		45	25	37	67	60	84	6	99	50	94	15	38	28	49	54	45	66				85	
Plain Mountain Finch <i>Leucosticte nematicola</i>				15	20			35	8		16	7	3	5	12								
Beautiful Rosefinch <i>Carpodacus pulcherrimus</i>		2		16	2	8	14	8	22	9	18	10	8	6	12	24	6	11				11	
Streaked Rosefinch <i>Carpodacus rubicillides</i>		6	2	2	4		2	5	6	6	12	10	11	6	6	2	2					1	
White-winged Grosbeak <i>Mycerobas carpinus</i>																						2	
Godlewski's Bunting <i>Emberiza godlewskii</i>		1		2						2		19			4	2	5	3				3	
No. of species seen		43	43	36	42	29	42	26	53	26	47	29	43	37	44	42	52	46	58				